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Abstract

THE NERO-REACTOR FOR SHIP-PROPULSION

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This paper describes the design of the NERO-reactor for ship-propulsion and the experimental work performed to verify the design parameters of the reactor and auxiliary equipment.

The design covers a pressurized water reactor installation in which special consideration has been given to obtain a compact installation, a high degree of reliability and safety and a long core life. Novel features of the design are inter alia the proposed use of burnable poison incorporated in the uranium-dioxide fuel, an increased water circulation through the core as compared with the circulation through the external circuit obtained by hydraulic ejectors inside the reactor vessel, and a combined unit for heat exchanger, superheater and pump for the external circuit.

The design is being established and the experimental work is being performed under an association contract between R.C.N. and Euratom, effective since June 1961. The experimental work includes the performance of critical experiments with the KRITO-installation at Petten, the preparation of fuel pellets incorporating burnable poison, performance testing of fuel rods under irradiation in the High Flux Reactor at Petten, dynamic measurements on a model heat exchanger, for which an installation is being erected at the Technological University of Eindhoven, and on a full sized pressurizer in operation at the Technological University of Delft.

Contracts have been given to industry for development of several items, and investigations concerning corrosion, welding problems, heat extraction, hydraulics and shielding are under way.

The paper will include the results of experimental work obtained thus far.